

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



17 DEC 2004

(43) International Publication Date  
24 December 2003 (24.12.2003)

PCT

(10) International Publication Number  
WO 2003/106734 A3

(51) International Patent Classification<sup>7</sup>: C23C 18/08,  
18/14, 18/06, H05K 3/10, C07F 15/00, 1/08, 1/10, 1/12,  
9/00, 11/00

(21) International Application Number:  
PCT/GIB2003/002613

(22) International Filing Date: 18 June 2003 (18.06.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0213925.1 18 June 2002 (18.06.2002) GB

(81) Designated States (*national*): AE, AG, AI, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SI, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): UNI-  
VERSITY COURT OF THE UNIVERSITY OF  
DUNDEE [GB/GB]; Nethergate, Perth Road, Dundee  
DD1 4HN (GB).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): THOMSON, James  
[GB/GB]; 13 Gaudry Terrace, Broughty Ferry, Dundee  
DD3 3JQ (GB).

(74) Agents: MACDOUGALL, Donald, Carmichael et al.;  
Cruikshank & Fairweather, 19 Royal Exchange Square,  
Glasgow G1 3AE (GB).

Published:

- with international search report
- before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

(88) Date of publication of the international search report:  
8 April 2004

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: METALLISATION

(57) Abstract: This invention relates to photosensitive organometallic compounds which are used in the production of metal deposits. In particular, this invention relates to photosensitive organometallic compounds such as bis-(perfluoropropyl)-1,5-cyclooctadiene platinum (II) (i.e.  $(C_3F_7)_2PtC_8H_{12}$ ) which on exposure to W radiation and then a reduction process forms a platinum metal deposit such as a substantially continuous thin 'sheet-like' film or a substantially narrow line which is capable of electrical conduction.

WO 2003/106734 A3

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/02613

A. CLASSIFICATION OF SUBJECT MATTER					
IPC 7	C23C18/08	C23C18/14	C23C18/06	H05K3/10	C07F15/00
	C07F1/08	C07F1/10	C07F1/12	C07F9/00	C07F11/00
According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIELDS SEARCHED					
Minimum documentation searched (classification system followed by classification symbols)					
IPC 7 C23C H05K C07F					
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched					
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)					
EPO-Internal, WPI Data, PAJ, INSPEC, CHEM ABS Data					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category *	Citation of document, with indication, where appropriate, of the relevant passages				Relevant to claim No.
X	EP 0 493 709 A (ABB PATENT GMBH)				17-19
Y	8 July 1992 (1992-07-08)				
	claims				1, 3, 8, 9, 12-14
	---				
X	FR 2 643 775 A (COTTE MARIE THERESE ; RAMY JEAN PIERRE (FR))				17-19
Y	31 August 1990 (1990-08-31)				
	claims				1, 3, 8, 9, 12-14
	---				
A	EP 0 391 314 A (MATSUSHITA ELECTRIC IND CO LTD) 10 October 1990 (1990-10-10)				1-19
	the whole document				
	---				
	-/--				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.					
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *A* document member of the same patent family					
Date of the actual completion of the international search			Date of mailing of the international search report		
26 January 2004			16.02.04		
Name and mailing address of the ISA European Patent Office, P.B. 5618 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016			Authorized officer  Brisson, O		

Form PCT/ISA/210 (second sheet) July 1992)

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/02613

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96 29726 A (MATSUSHITA ELECTRONICS CORP ;SYMETRIX CORP (US)) 26 September 1996 (1996-09-26) the whole document	1-19
X	CLARK, H. C. ET AL: "Reactions of (.pi.-1,5-cyclooctadiene)organoplatinum(II ) compounds and th synthesis of perfluoroalkylplatinum complexes" JOURNAL OF ORGANOMETALLIC CHEMISTRY (1973), 59, 411-28 , XP002268048 abstract page 426 page 421	20-40
X	YANG, DONG SHENG ET AL: "Electronic structure of square-planar cis-bis(trifluoromethyl)platinum(II complexes from UV photoelectron spectra and SCF-MS-X.alpha. calculations" INORGANIC CHEMISTRY (1990), 29(13), 2496-501 . XP002268049 paragraph 'EXPERIMENTAL!	20-40
X	US 4 530 879 A (DRAHNAK, TIMOTHY J.) 23 July 1985 (1985-07-23) column 4, line 8-57	20-28
X	DEACON, G. B. ET AL: "Preparation and ligand displacement reactions of diene(polyfluorophenyl)platinum(II) complexes" JOURNAL OF ORGANOMETALLIC CHEMISTRY (1987), 322(2), 257-68 , XP002268050 abstract	20-27
X	KING, R. B. ET AL: "Organosulfur derivatives of the metal carbonyls. XIV. Reactions of trifluoromethylthiosilver with certain norbornadiene and tetraphenylcyclobutadienemetal complexes" INORGANIC CHEMISTRY, vol. 10, no. 7, 1971, pages 1376-1379, XP002268051 the whole document	20-27

-/--

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/02613

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GARCIA, J. ET AL: "Homoleptic binuclear platinum compounds with C6F5S- and C6HF4S-" INORGANICA CHIMICA ACTA (1993), 207(1), 93-6 , XP002268052 page 93 -page 94 ---	20-27
X	RIVERA, GUILLERMINA ET AL: "Dynamic Study of Homoleptic Bimetallic Platinum(II) Complexes Bridged by Fluorinated Benzenethiolates" INORGANIC CHEMISTRY (2001), 40(22), 5575-5580 , XP002268053 page 5576 -page 5577 ---	20-27
X	BRUNE, HANS ALBERT ET AL: "Photochemical reactivity of substituted .eta.2-bis(diphenylstibino)methane!bis(phenyl)platinum(II) compounds" JOURNAL OF ORGANOMETALLIC CHEMISTRY (1989), 371(1), 113-20 , XP002268054 page 118, paragraph SYNTHESSEN ---	20-26
X	CHAUDHURY, N. ET AL: "Preparation and electronic spectra of some alkyl- and aryl(2,2'- bipyridine)platinum(II) complexes" JOURNAL OF ORGANOMETALLIC CHEMISTRY (1975), 84(1), 105-15 , XP002268055 the whole document ---	20-25
X	ESPINET, P. ET AL: "3,5-dichlorotrifluorophenyl complexes, aryl derivatives with simple 19F NMR structural probes. The synthesis of general precursors for Pd- and Pt complexes" JOURNAL OF ORGANOMETALLIC CHEMISTRY, vol. 551, 1998, pages 9-20, XP002268056 the whole document -----	20-25

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 03/02613

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

Continuation of Box I.2

Present claim 20 relate to an extremely large number of possible compounds. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the compounds of formula (I), where M is any of the metals listed in claim 20, A is oxygen or sulfur, X is 0 or 1, R is a fluoroorgano group of 1-12 carbon atoms, L is cyclooctatetraene or cyclooctadiene.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-19

A method of forming metal deposit on a substrate comprising irradiating a photosensitive organometallic compound with UV radiation and reducing the irradiated compound to form metal deposits adhered to the substrate. The metal deposits obtainable thereof.

2. Claims: 20-40

A photosensitive organometallic compound and a process for producing it

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/02613

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0493709 A	08-07-1992	DE 4042220 A1	02-07-1992
		EP 0493709 A2	08-07-1992
		JP 2065945 C	24-06-1996
		JP 4362178 A	15-12-1992
		JP 7100868 B	01-11-1995
FR 2643775 A	31-08-1990	FR 2643775 A1	31-08-1990
EP 0391314 A	10-10-1990	JP 2264254 A	29-10-1990
		JP 2538043 B2	25-09-1996
		DE 69015857 D1	23-02-1995
		DE 69015857 T2	24-05-1995
		EP 0391314 A2	10-10-1990
		KR 9302698 B1	07-04-1993
		US 5173330 A	22-12-1992
WO 9629726 A	26-09-1996	US 6133050 A	17-10-2000
		CA 2214563 A1	26-09-1996
		CN 1179231 A ,B	15-04-1998
		EP 0815587 A1	07-01-1998
		JP 11508086 T	13-07-1999
		WO 9629726 A1	26-09-1996
		US 6537830 B1	25-03-2003
		US 5909042 A	01-06-1999
		US 5871853 A	16-02-1999
		US 6559469 B1	06-05-2003
		US 2003152813 A1	14-08-2003
US 4530879 A	23-07-1985	AT 34986 T	15-06-1988
		AU 565429 B2	17-09-1987
		AU 2522584 A	06-09-1984
		CA 1256060 A1	20-06-1989
		DE 3471937 D1	14-07-1988
		DK 130884 A	05-09-1984
		EP 0122008 A1	17-10-1984
		ES 8601219 A1	16-02-1986
		JP 1784446 C	31-08-1993
		JP 4077026 B	07-12-1992
		JP 59168061 A	21-09-1984
		KR 9303805 B1	13-05-1993